

PROJECT INITIATION FORM  
R&D LABORATORY

PROJECT TITLE: Tunable Version of RR-33

PROJECT NUMBER: 2531 NOMENCLATURE None PRIORITY H1

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SOURCE OF REQUEST: [redacted] DATE REC'D 22 May 1959

AUTHORITY: [redacted] LIAISON CONTACT: [redacted]

RESPONSIBILITY: UNIT Design ENGINEER [redacted] 50X1

PROJECT DESCRIPTION: 50X1

- 1. EUCA has a requirement for tunable receiver covering minimum frequency range of 3 to 6.5 mcs. Unit should have reasonable tuning accuracy and stability and sensitivity approximately equal that of the RR-33. Case size may be approximately that of the RR-33.
- 2. Determine whether using Zenith Royal 500D Receiver or equivalent commercially made equipment, we can design and fabricate a unit to meet EUCA's requirement. A report outlining the procedures and problems involved as well as approximate time to develop first prototype is required.

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Mech. Fab. Lab  
Elec. Fab.

SIGNED \_\_\_\_\_  
DATE Chief, R&D Laboratory

~~SECRET~~

50X1

*No further reporting  
required per CTB  
Map.*

### TUNABLE VERSION OF THE RR-33

A request was made for a tunable version of the RR-33 receiver. *new*

The unit was to tune the frequency range of 3 - 6.5 mc. The unit was to be fabricated by modifying the RF and oscillator stages of a Zenith Royal 500D receiver.

*approach*  
As a first ~~approved~~ the original tuning capacitor was retained and the RF and oscillator stages were modified. This unit would tune from 3 to 6 mc. The 10 db S/N sensitivity was approximately 3 uv. Image rejection was zero db.

*3 to 6  
or 3 to 5.5?*  
In order to tune a full 3 to 6.5 mc as requested a new tuning capacitor was tried. With the new tuning capacitor the unit had about the same electrical characteristics as the unit previously mentioned and it tuned from 3 to 6.5 mc. The new capacitor (an Argonne Poly Varican) did not have a vernier and therefore tuning was difficult. Because of tuning difficulty, the original capacitor was put back into the unit.

Improvement of image rejection was attempted by using a higher Q coil in the antenna circuit. This was discarded because of tracking difficulties.

A model was fabricated by using the original tuning capacitor.

Following is a list of the changes that were made.

*This document is not to be interpreted  
as a statement of fact. It is intended to be  
subjected to technical evaluation.*

2. The following changes were made in the receiver. (Refer to

the partial schematic of Figure 1 and the schematic for the Zenith Royal 500D which is attached).

- (a) The RF stage was converted to an emitter follower by removing C5 and L2.
- (b) R5 was replaced by a 47K resistor.
- (c) C8 was replaced by a 100 uuf capacitor which was connected back to the emitter of X1.
- (d) 165 turns were removed from the oscillator coil L3.
- (e) The oscillator transistor (2N409) would not oscillate above 4.5 mc. It was replaced by a 2N247.
- (f) L1 removed and replaced by a ~~CTC Inductor~~ *slightly tuned coil*.

ROUGH DRAFT

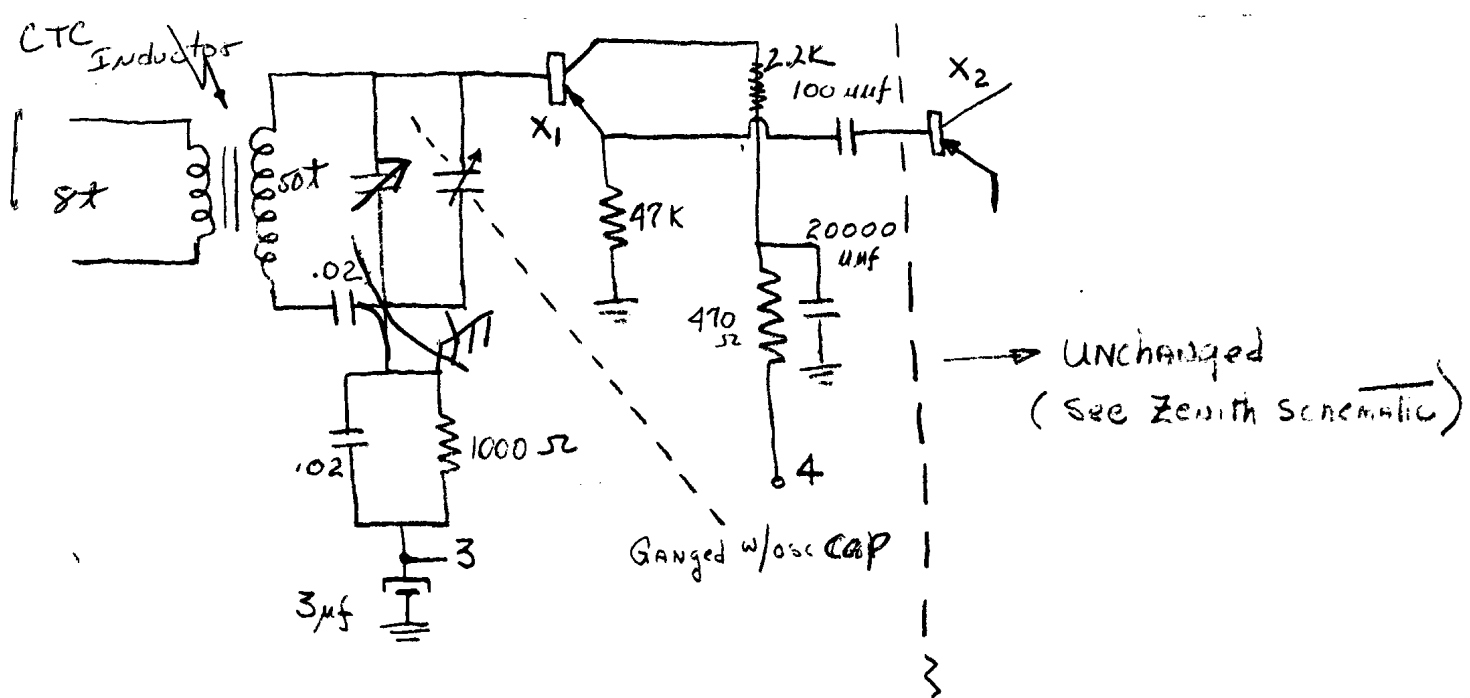


FIGURE 1  
PARTIAL SCHEMATIC (Showing CKT changes)

3. After making the change outlined in paragraph 2, the unit had the following electrical characteristics:

(a) 10 db S/N Sensitivity

<u>Frequency</u>	<u>Sensitivity</u>	<u>Image Rejection (db)</u>
3	3.3 uv	1
4	3.3 uv	0
5	2.9 uv	0
6	2.8 uv	0

- (b) The image rejection of the receiver is poor.
- (c) A ground on the antenna must be used for best sensitivity.
- (d) Tuning range = 3 - 6 mc

4. The above results indicated that the full 3 to 6.5 mc frequency range will not be attained. However a unit can be made to tune from 3 - 6 mc with good sensitivity if the low image rejection can be tolerated.

